

EARTH'S BRIDGE TO SPACE

LSAP

LAUNCH

SERVICES

PROGRAM



Agenda

Evolution of Spaceflight

Who We Are

LSP Services

LSP Roles

LSP Fleets

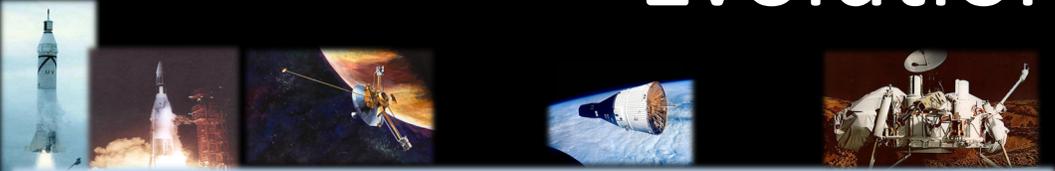
LSP Resident Offices

LSP Missions

Delivering Excellence



Evolution of Spaceflight



NASA Science via Gov't



NASA Science and DoD via Commercial



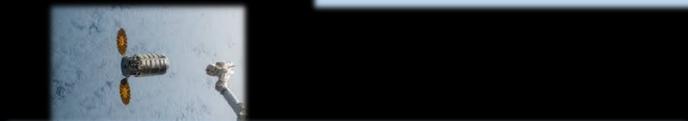
DOD via Gov't



NASA Human via Gov't



NASA Human via Commercial Launch



NASA Cargo via Commercial Launch

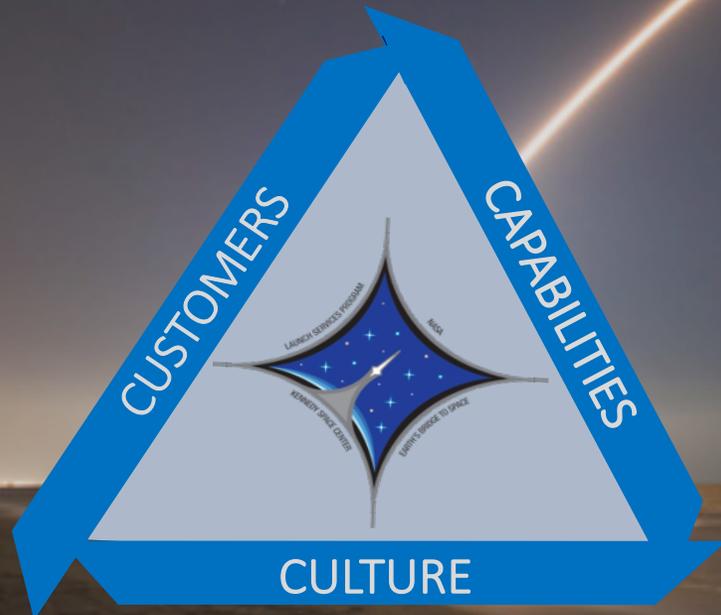
1958-1970 1971-1980 1981-1990 1991-2000 2001-2010 2011-2020 Beyond

LSP Mission:

Uniting customers, capabilities, and culture to explore space
through unparalleled launch services

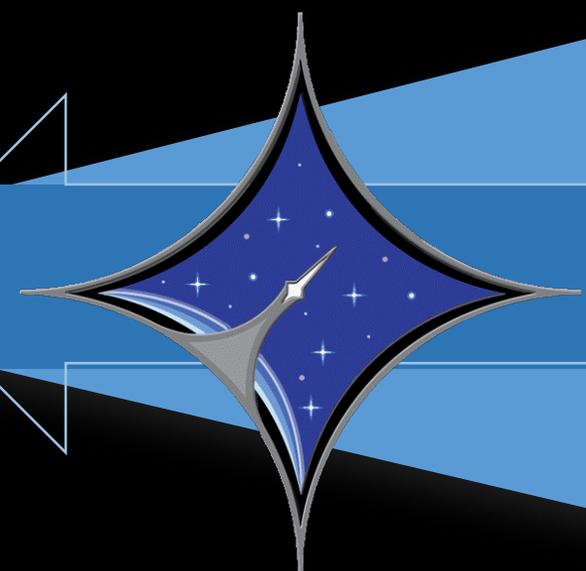
LSP Vision:

Science and discovery through unlimited
access to the universe



Goals

- Maximize Mission Success
- Assure Long-Term Launch Services
- Promote Evolution of a US Commercial Space Launch Market
- Continually Enhance LSP's Core Capabilities



Goddard
Space Flight Center



COMMERCIAL
CREW
PROGRAM



LAUNCH SERVICES PROGRAM PARTNERS



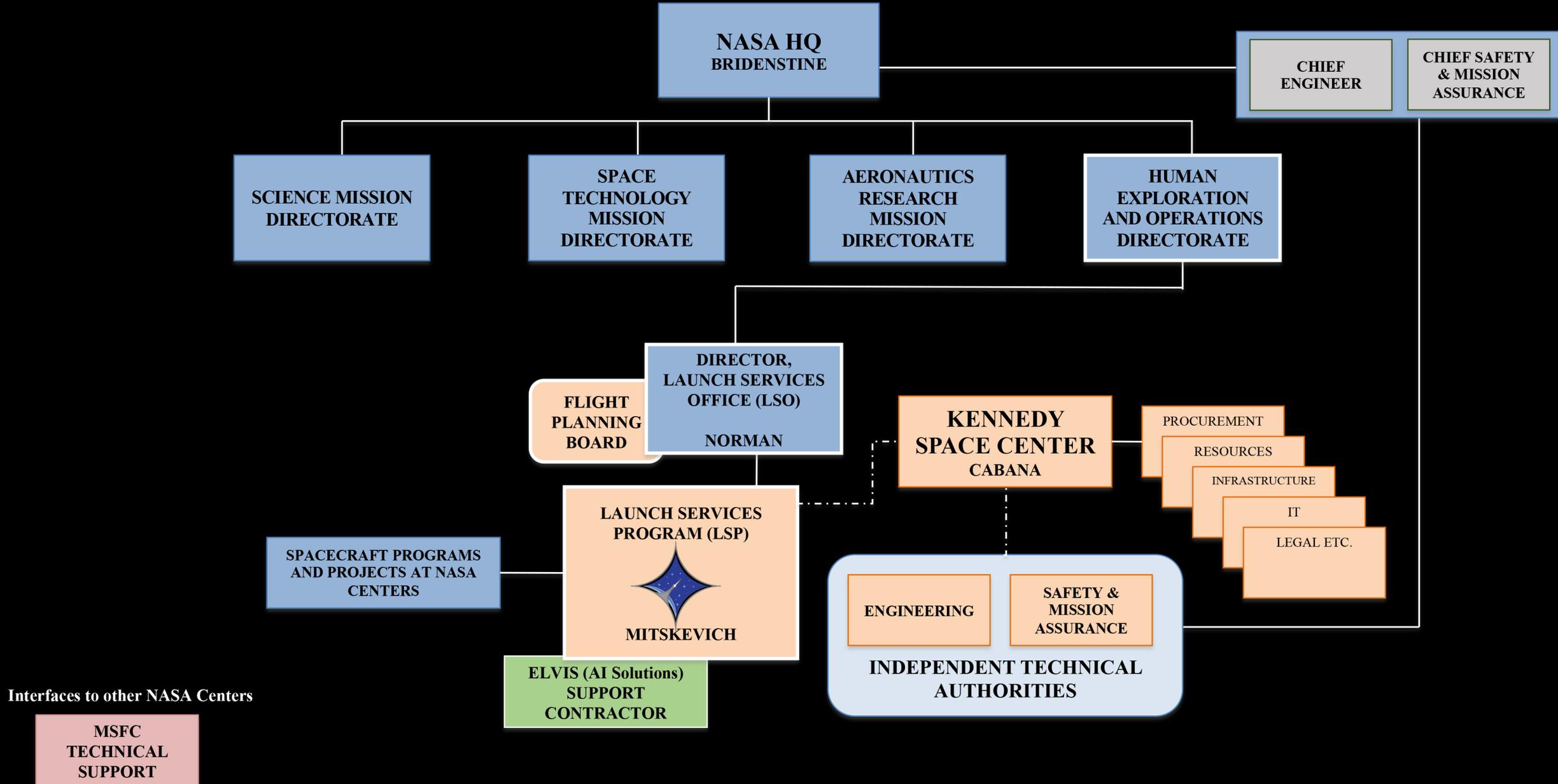
Jet Propulsion Laboratory
California Institute of Technology



Space Technology Mission Directorate



Launch Services



The People of LSP

TURNOVER RATE TO
DATE

2.91%

YEARS AS A NASA
PROGRAM

20

EXPERIENCE



AVERAGE
EXPERIENCE

16.7 Years

ADVANCED DEGREES

45%

RETIREMENT ELIGIBILITY

Retirement
Eligible

18%

Eligible Within 5
years

27%





Commercial Acquisition Expertise

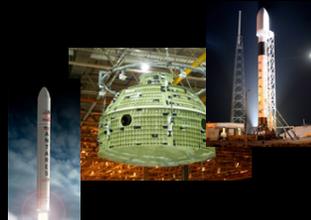
Commercial Space Act
National Space Policy
National Space Transportation Policy



Insight &
Approval



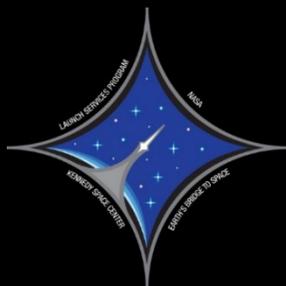
Higher Risk
Tolerance;
Less Insight &
Approval



Advisory
Services

Formalized Government Collaboration

Memorandum of Understanding – March 2011
Government Launch Executive Board, GLEB (Quarterly)
Current Launch Schedule Review Board (CLSRB)
USAF-NASA-NRO Summit



Program Management, Analysis, Engineering, Integration, & Launch Operations

Experience: technical, stable civilian workforce, mixed civil service & contractors, 20+ years average in launch

Consistency: 90 full missions + advisory + cubesats and secondaries

Flexibility: Evolving expertise to meet new approaches

On Target

- Technical Assessment
- Launch Mgmt. w/ "GO" for Launch
- 97+% Mission Success rate

On Time

- Mission Management
- Risk Management

On Cost

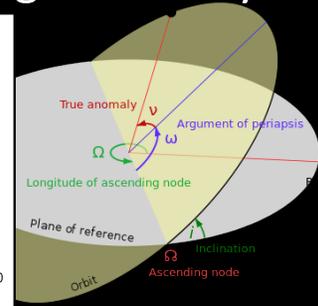
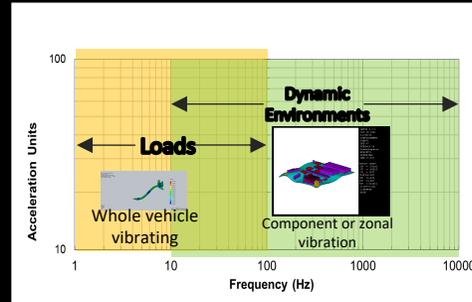
- Success in Fixed Price Contract Mgmt.

Traditional LSP Roles and Responsibilities

Acquire Launch Services



Verify and validate mission engineering and analysis



Manage launch vehicle to spacecraft integration



Insight and approval of production, integration, testing and processing



Certify launch systems for NASA use

U.S. Manifest Coordination thru CLSRB



LSP Fleets

Northrop Grumman



Pegasus XL



Minotaur C



Antares

United Launch Alliance



Atlas V



Delta II



Delta IV Heavy

SpaceX



Falcon 9



Falcon Heavy

Venture Class Launch Services



Launcher One



Electron

Emerging Vehicles



Firefly



Terran 1



New Glenn



OmegaA

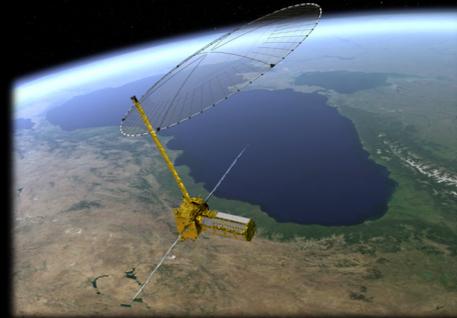
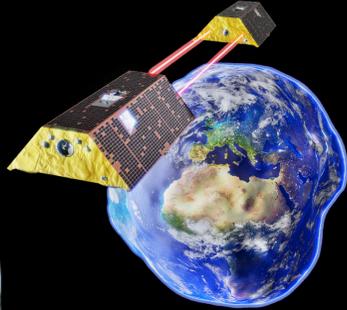
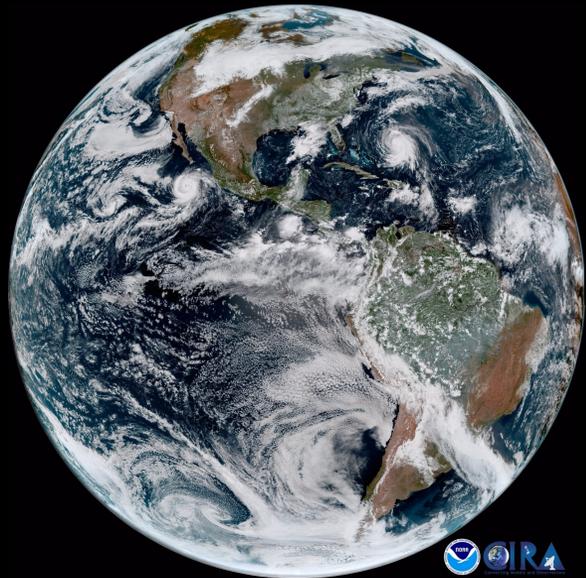
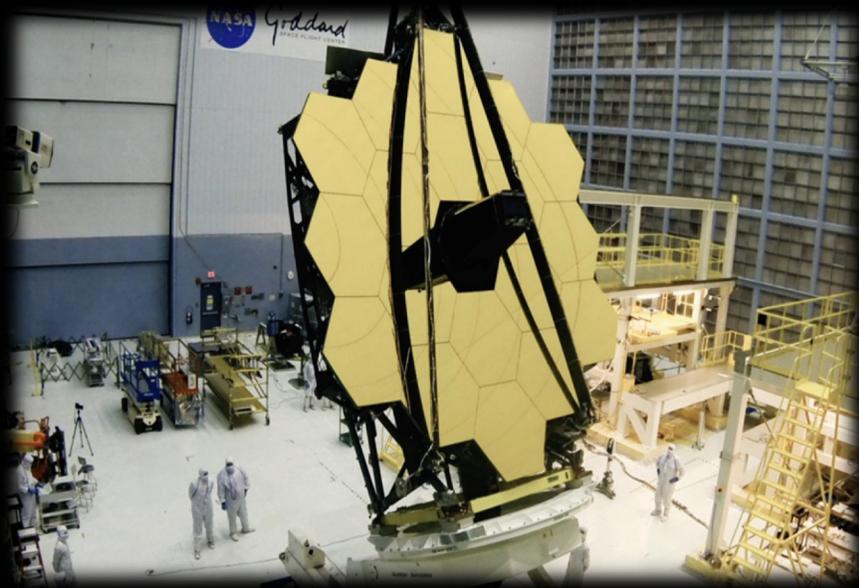


Vulcan

Resident Offices



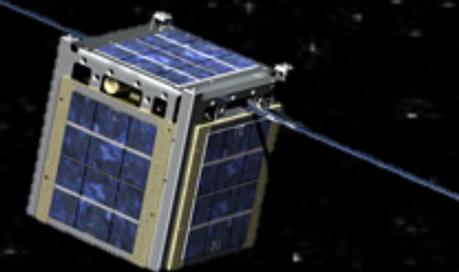
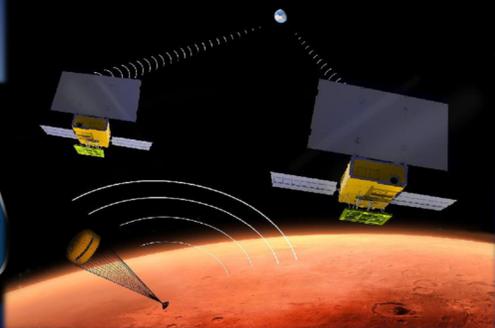
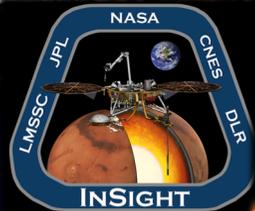
Advisory



ADVISORY MISSIONS



Maximizing Rideshare and Venture Class Launch Service Opportunities



NEXT-XL Demo Named Venture Class Launch Services (VCLS)



Rocket Lab Electron's First Launch
12/17/18

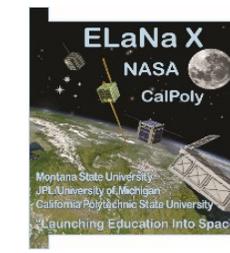
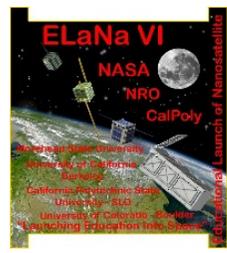
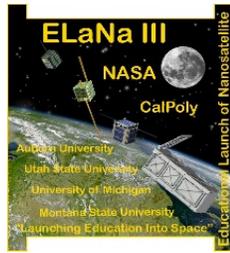
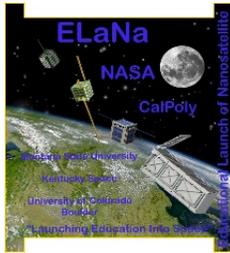
VCLS Demos Awarded

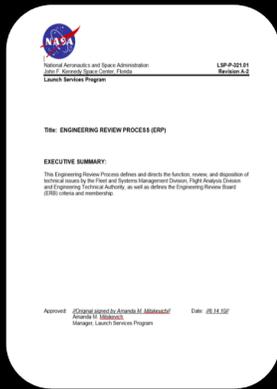
2019

Virgin Orbit
First Launch

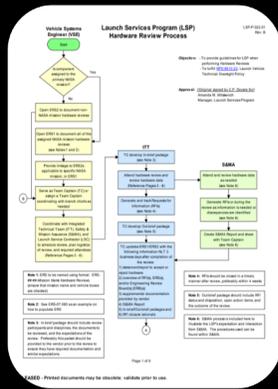
Cubesat/ELaNa MISSIONS

Educational Launch of Nanosatellites (ELaNa)

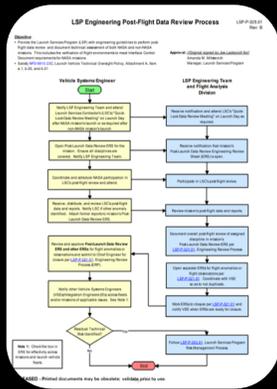




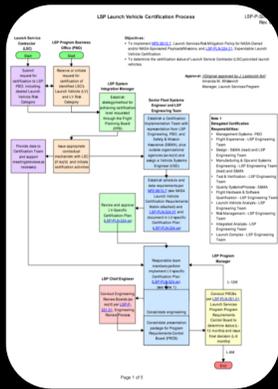
Engineering Review Process



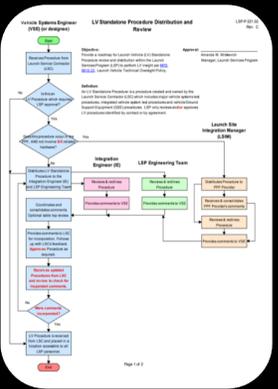
LSP Hardware Review Process



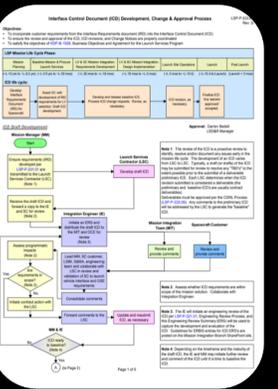
Post-Flight Data Review Process



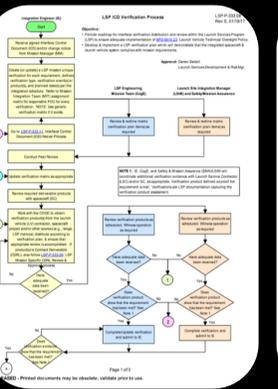
Launch Vehicle Certification Process



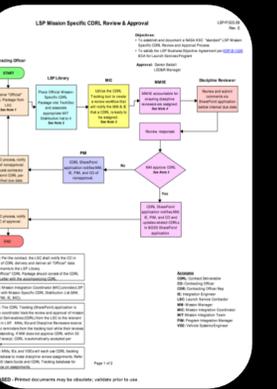
LV Standalone Procedure Review Process



LSP ICD Process



LSP ICD Verification Process



LSP Mission Specific CDRL Review & Approval

Mission First

- Over 20 years of heritage of launch vehicle mission assurance in the “non-government-owned” launch vehicle world
- Adaptable to changing environments
 - New providers
 - Heritage customers with new requirements
 - New Agency customers using commercial launch vehicles, with different procurement approaches
- Full manifest of missions to execute “traditionally” and in advisory capacity

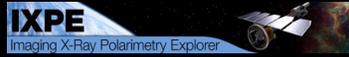
Back-Up

What's Next

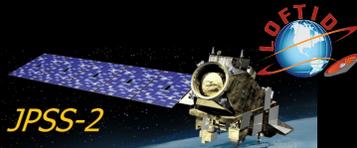
2020



2021

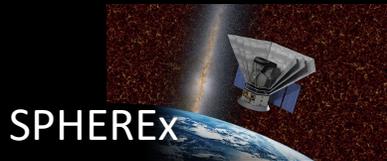


2022



Restore-L
w/EscaPADE & Janus

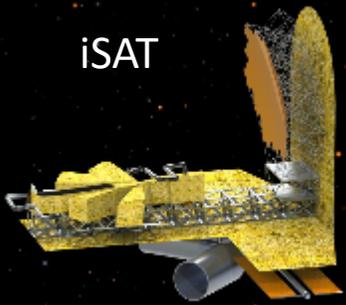
2023



2024



2025 & Beyond



iSAT



JPSS-3



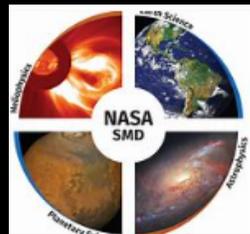
JPSS-4



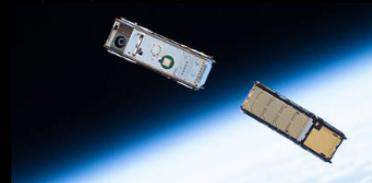
NEOCam



CRS Missions



MiDEX & SMEX
AOs



ELaNa Missions



AO



CCP Missions